the first period, while at the other stations the mean of the second 25-year period was but a few tenths degree above the 50-year average.

TABLE 3.—*Overlapping or simultaneous records.*

Year.	Fort Snelling, Minn.				Fort Ripley, Minn.				Difference.
	Dec.	Jan.	Feb.	Mean.	Dec.	Jan.	Feb.	Mean.	
1854–55	20.6	17.1	12.6	16.8	18.2	8.4	8.2	11.6	—5.2
1855–56	9.5	6.1	11.7	9.1	5.0	— 1.5	9.0	4.2	—4.9
1856–57	8.8	— 2.5	16.4	7.6	5.1	— 6.5	11.2	3.3	—4.3
Mean	....	....	....	11.2	....	....	....	6.4	—4.8
	Fort Snelling, Minn.				St. Paul, Minn.†				
1867–68	16.1	4.2	13.9	11.4	15.2	4.4	12.7	10.8	—0.6
1868–69	15.5	18.2	19.4	17.7	16.3	19.0	18.7	18.0	+0.3
1869–70	19.5	12.6	17.0	16.4	20.4	12.2	17.1	16.6	+0.2
1870–71	19.6	13.1	20.2	17.6	19.4	13.4	20.7	17.8	+0.2
1871–72	7.7	13.8	18.4	13.3	8.8	14.2	19.6	14.2	+0.9
1872–73	3.9	4.4	11.0	6.4	5.8	6.0	13.3	8.4	+2.0
Mean	....	....	....	13.8	....	....	....	14.3	+0.5
1882–83	11.6	— 2.8	8.9	5.9	16.0	1.1	12.1	9.7	+3.5
1883–84	15.8	3.7	8.0	9.2	19.8	7.9	13.3	13.7	+4.5
1884–85	8.9	— 0.8	4.6	4.2	14.8	4.6	9.9	9.8	+5.6
1885–86	21.3	3.5	14.5	13.1	21.1	4.1	15.0	13.4	+0.3
1886–87	7.3	— 1.1	8.4	4.9	8.4	1.0	9.7	6.4	+1.5
1887–88	16.1	— 2.3	10.5	8.1	17.1	— 0.9	13.4	9.5	+1.4
1888–89	25.4	18.3	5.9	16.5	24.8	20.2	10.2	18.4	+1.9
1889–90	29.1	10.9	19.9	20.0	28.6	9.9	18.5	19.0	—1.0
1890–91	21.7	19.6	8.7	16.7	24.0	21.2	11.2	18.8	+2.1
1891–92	29.4	10.8	23.0	21.1	27.3	10.0	20.8	19.4	—1.7
Mean	....	....	....	12.0	....	....	....	13.8	+1.8
	Fort Leavenworth, Kans.				Leavenworth, Kans.				
1866–67	28.1	21.0	32.3	27.1	27.6	19.5	31.8	26.3	—0.8
1867–68	34.6	19.6	32.2	28.8	33.3	17.9	30.0	27.1	—1.7
1868–69	26.4	33.8	32.9	31.0	22.6	29.7	30.3	27.5	—3.5
1869–70	26.4	29.1	35.1	30.2	28.2	25.6	32.1	28.6	—1.6
1870–71	28.6	30.4	38.1	32.4	28.0	27.5	33.5	29.7	—2.7
Mean	....	....	....	29.9	....	....	....	27.8	—2.1
	Leavenworth, Kans.				Kansas City, Mo.				
1888–89	35.8	29.8	27.5	31.0	35.9	31.2	28.5	31.9	+0.9
1889–90	45.3	28.1	32.3	35.2	46.4	30.2	34.0	36.9	+1.7
1890–91	37.0	33.2	29.8	33.3	37.4	34.0	30.2	33.9	+0.6
1891–92	39.3	23.9	36.4	33.2	39.6	25.6	36.8	34.0	+0.8
1892–93	26.0	21.8	26.6	24.8	27.2	22.0	26.9	25.4	+0.6
Mean	....	....	....	31.5	....	....	....	32.4	+0.9
	Washington, D. C.				Georgetown, D. C.				
1870–71	34.0	32.6	35.9	34.2	34.3	31.7	36.7	34.2	0.0
1871–72	32.1	31.7	33.7	32.5	30.1	30.4	32.1	30.9	—1.6
1872–73	30.3	30.9	34.8	32.0	27.8	29.2	32.1	29.7	—2.3
1873–74	40.5	40.3	37.2	39.3	38.0	37.3	35.6	37.0	—2.3
1874–75	39.2	29.5	28.8	32.5	36.0	27.1	27.2	30.1	—2.4
Mean	....	....	....	34.1	....	....	....	32.4	—1.7
	Cincinnati, Ohio (not W. B.).				Cincinnati, Ohio (W. B.).				
1870–71	30.8	34.5	36.6	34.0	30.9	36.8	39.3	35.7	+1.7
1871–72	29.7	28.2	32.3	30.1	32.6	30.5	33.6	32.2	+2.1
1872–73	25.4	27.1	31.3	27.9	29.1	30.8	35.5	31.8	+3.9
Mean	....	....	....	30.7	....	....	....	33.2	+2.5

†Values for series 1867–1873, inclusive, from voluntary records; for series 1882–1892 from Weather Bureau records.

In this connection it should be borne in mind that the data prior to the establishment of the Weather Bureau stations were obtained from instruments believed to have been exposed in shelters over sod, and in the open, and which, during the winter time, would give lower temperatures than instruments having exposures such as obtain at Weather Bureau stations. This fact would modify, if not reverse, the slight apparent higher average temperature during the second 25-year period at the majority of stations; and this statement is, I think, fully borne out, especially if the mixed data for Forts Snelling and Leavenworth are omitted, by comparing the data given in Table 2 for the two 25-year periods with each other, and with the winter of 1903–4, which shows that the winter of 1903–4 at Cleveland, Ohio, was by 0.4° the coldest, and at New Bedford 1.3° the coldest, in fifty years. Washington, D. C., had one winter colder and one with the same mean, both in the first twenty-five years; at Charleston one was colder in each period; Chicago and Cincinnati, each, one colder, in the first period; St. Louis, three colder in the first and five colder in the second period; New Orleans, eight winters colder in the first period (17 years) and nine colder in the second; Fort Leavenworth, fourteen colder in the first period and eleven colder in the second; and Fort Snelling, six colder in the first and five colder in the second period.

By reference to the article "The winter of 1903–4," page 125 of the MONTHLY WEATHER REVIEW for March, 1904, it will be found that the last winter was unusually cold over the portion of the United States covered by the accompanying data only.

TABLE 4.—*Thermometer exposure.*

Station and date of establishment.	Kind of shelter.	Height above ground.	Date changed.	Intervals.	
				Years.	Months.
		Feet.			
St. Paul, Minn., Nov. 1, 1870	Window	32	Apr. 16, 1883	12	6
Do	Window	44	Sept. 1, 1885	2	4
Do	Roof	114	Nov. —, 1903	8	2
Do	Roof	102	Present	0	7
Leavenworth, Kans., May 26, 1871	Window	34	Jan. 1, 1892	20	8
Do	Roof	95	Nov. 10, 1893	1	10
Kansas City, Mo., July 1, 1888	Roof	86	May 1, 1890	1	10
Do	Roof	78	Present	14	1
New Orleans, La., Oct. 24, 1870	Window	7	Nov. 18, 1871	1	1
Do	Window	29	Mar. 3, 1880	8	3
Do	Window	45	Aug. 1, 1885	5	4
Do	Roof	87	July 19, 1890	5	0
Do	Roof	112	Oct. 31, 1900	10	3
Do	Roof	88	Present	3	8
St. Louis, Mo., Oct. 12, 1870	Window	70	July 15, 1871	0	9
Do	Window	72	Mar. 3, 1873	1	9
Do	Window	84	Apr. 1, 1879	6	1
Do	Roof	105	Sept. 15, 1883	4	5
Do	Roof	70	Sept. 1, 1887	4	0
Do	Dome	107	Oct. 1, 1892	5	1
Do	Dome	110	Aug. 16, 1903	10	10
Do	Roof	208	Present	0	10
Chicago, Ill., Oct. 14, 1871	Window	42	June 14, 1872	0	8
Do	Window	74	June 8, 1873	1	0
Do	Window	70	Dec. 31, 1886	13	6
Do	Roof	144	Feb. 1, 1890	3	1
Do	Roof	241	Present	14	5
Cincinnati, Ohio, Oct. 12, 1870	Window	68	Jan. 1, 1885	14	5
Do	Roof	84	Mar. 1, 1885	0	2
Do	Roof	153	Aug. 16, 1898	13	6
Do	Roof	152	Present	5	10
Cleveland, Ohio, Oct. 17, 1870	Window	30	Apr. 30, 1873	2	6
Do	Roof	45	July 26, 1879	6	3
Do	Roof	73	Nov. 14, 1884	5	3
Do	Roof	82	July 1, 1888	3	7
Do	Roof	69	Oct. 14, 1889	1	4
Do	Roof	118	Jan. 1, 1891	1	2
Do	Roof	97	May 1, 1892	1	5
Do	Roof	122	Oct. 1, 1896	4	6
Do	Roof	190	Present	7	9
Washington, D. C., Nov. 1, 1870	Window	44	Aug. 15, 1888	17	8
Do	Roof	58	Mar. 29, 1889	0	8
Do	Roof	59	Present	15	3
Charleston, S. C., Jan. 1, 1871	Window	41	Jan. 1, 1886	15	0
Do	Roof	60	Feb. 1, 1897	11	1
Do	Sod	14	Present	7	5

THE CROW CREEK FLOOD OF MAY 20, 1904, AT CHEYENNE, WYO.

By W. S. PALMER, Section Director, Cheyenne, Wyo.

The most disastrous flood in the history of Cheyenne occurred on the night of May 20, 1904, when, as a consequence of heavy rains or cloudbursts over its upper drainage area, Crow Creek became a raging torrent, overflowing its banks, flooding the adjacent lowlands, and carrying away bridges and houses. The flood was unusual, as Crow Creek is normally but a small stream, and during much of the summer and fall its flow is so much reduced that a person can readily step across its bed.

Crow Creek rises in the mountains west of Cheyenne, and is formed by the junction of three streams, South Crow, Middle

Crow, and North Crow. The drainage area west of Cheyenne embraces a territory of approximately 350 square miles, the elevation of which varies from 6000 to 9000 feet above sea level.

The rainfall over southeastern Wyoming during the first two decades of May was unusually heavy, but the snowfall during the previous winter had been unusually light. No precipitation records had been kept in the Crow Creek Valley, except at Cheyenne. During the night of the 19th, a rainfall of 0.63 of an inch was recorded at Cheyenne, followed on the 20th by 1.10 inches, nearly one inch of which fell between 4 and 5 p. m. It is to be regretted that more extensive rainfall records for Crow Creek Valley are not available, as it is probable that the precipitation was much heavier along the valley of Middle and South Crow than at Cheyenne; at least reports and circumstances seem to so indicate.

The streets of Cheyenne were flooded during the afternoon and evening, although little or no damage was done on the higher grounds. The damage was done on the lowlands along the course of the creek, which skirts the western edge of the city, flows beneath the tracks of the main line of the Union Pacific Railroad, and then through the south side of Cheyenne.

The large volume of water poured into the creek during the afternoon raised the stream to an unprecedented height, reliable reports indicating that the wall of water which swept down the creek during the evening was from 20 to 25 feet high in places. Owing to lack of telephonic communication, no warning could be given the people of the approaching flood, and the residents on the "flats" along the creek in the western part of Cheyenne were caught in their homes, with no chance for escape except through the raging waters. The crest of the flood reached Cheyenne about 9 p. m., local time, and within two hours had begun to subside. By the following morning the creek was again confined within its banks.

The greatest danger from the flood was in west Cheyenne, on the "flats," where the water was somewhat checked in its flow by the embankment of the Union Pacific Railroad tracks, and where all of the lowlands were flooded to a depth of from 4 to 10 feet. The fire bells brought the people to the scene, and willing hands did all that could be done to rescue the people from their homes, which in some cases were being carried away by the flood. Row boats were rapidly brought from a lake about a mile away. Mounted men readily rode into the flood, at the risk of their lives, and brought people to places of safety. The darkness of the night made the work of rescue exceedingly dangerous, but the rescuers were spurred to their greatest efforts by the cries of the imprisoned people. Although many were in imminent danger of drowning, the loss of life was limited to two children.

The damage from the flood was not as great on the south side, where the creek had a chance to overflow a much wider section, with a consequent diminution in the rapidity of the flow. While some fences, walks, and outbuildings were slightly damaged, no dwellings were washed away.

The loss from the flood throughout the entire Crow Creek Valley is difficult to estimate, but it was probably more than $100,000. Several miles of the Colorado & Southern Railroad tracks were washed away above Cheyenne, and the bridge on the Denver division of the Union Pacific Railroad was so much damaged that traffic was suspended for two or three days. There was not a bridge left in serviceable condition across the creek, except the bridge on the main line of the Union Pacific Railroad. Two substantial steel bridges in the city were ruined, besides several bridges of cheaper construction. Some damage was done at Fort D. A. Russell, 4 miles west of Cheyenne. On the "flats" in west Cheyenne about a dozen houses were washed from their foundations.

A reliable estimate of the flow of the creek during the passage of the flood wave places it at 7000 cubic feet per second, or a total of over 70,000,000 cubic feet during the three hours of highest water. The normal flow of Crow Creek is but 10 cubic feet per second. The highest water ever gaged in the Laramie River, which drains an area ten times as great as the area drained by Crow Creek above Cheyenne, was but 6500 cubic feet per second, 500 cubic feet less than the estimated flow of Crow Creek during the flood of May 20, 1904.

RECENT PAPERS BEARING ON METEOROLOGY.

Mr. H. H. KIMBALL, Librarian, etc.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the Library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau. Unsigned articles are indicated by a ——.

Broad Views. London, Vol. 1.
- **Eliot, John.** The Meteorology of the Empire, during the Unique Period 1892–1902. Pp. 191–201.

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- **Lodge, Oliver.** Steps toward a New Principia. Electricity and Matter. Pp. 73–76.
- **Borgmann, L.** Radio-activity of Russian Muds and Electrification of Air by Metals. Pp. 80–81.
- —— The Stability of Solar Spectrum Wave-Lengths. P. 87.

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- **Bonacina, L.** The Varying Distribution of Atmospheric Pressure over the Surface of the Earth. Pp. 62–65.
- **Clements, Hugh.** Some Weather Prophets. Pp. 65–66.

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- **Poynting, J. H.** Radiation in the Solar System: Its Effect on Temperature and its Pressure on Small Bodies. Pp. 525–552.

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- **Baden-Powell.** Aeroplane Experiments at the Crystal Palace. Pp. 111–114.

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- **De Forest, Lee.** Concerning Wireless Telegraph Transmitters P. 23779.

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- **Lindsey, Edward.** A Reddish-Brown Snowfall. P. 893.
- **F., W. S.** The Electron Theory. Pp. 896–899.
- —— Professor Rutherford on Radium. [Review of lecture of E. Rutherford.] Pp. 899–900.
- **Davis, Bergen.** A suggestive relation between the Gravitational Constant and the Constants of the Ether. Pp. 928–929.

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- **Langley, S. P.** On a possible variation of the Solar Radiation and its probable effect on Terrestrial Temperatures. Pp. 305–321.

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- **Ward, R. DeC.** Rainfall and Crops in California. [Review of article of A. G. McAdie.] Pp. 277–278.

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- **Vanderlinden, E.** Les végétaux et la gelée. Pp. 121–128.
- **Lockyer, N.** Simultanéité des changements solaires et terrestres. Pp. 128–137.
- —— Le climat de la Mandchourie. [Review of communications of J. Ross.] P. 168.

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- **Gorodensky, M.** Recherches concernant l'influence de la rotation diurne de la terre sur les perturbations atmosphériques. Pp. 113–120.

Annales de Chimie et de Physique. Paris. 7me série. Tome 2.
- **Violle, J.** Rapport sur la radiation au Comité international météorologique à Southport, en 1903. Pp. 134–144.